

THE MODERATOR ROLE OF JOB STRESS IN THE RELATIONSHIP BETWEEN SUSTAINABLE LEADERSHIP AND INNOVATION STRATEGIES

Mesut ÖZTIRAK* & Ayşe Meriç YAZICI**

Abstract

The purpose of this study is to investigate the regulatory role of job stress in the relationship between sustainable leadership and innovation strategies. In the studies conducted in the literature, there is no study in which the regulatory role of job stress in the relationship between sustainable leadership and innovation strategies is measured. This situation is important as it constitutes a priority and originality factor for the study. The population of the study consists of employees working in the information and communication sector operating in Turkey. The sample is 402 employees working in the information and communication sector in the Ataşehir region of Istanbul province, selected by convenience sampling method. In the study, scale scores were calculated and kurtosis and skewness coefficients were analyzed to determine the suitability of the scores for normal distribution. Since the scores showed normal distribution, parametric test techniques were used in the study. The t-test and ANOVA test were used to analyze the differences in scale scores according to demographic characteristics. In addition, while analyzing the relationship between the scales with the correlation coefficient, the Process macro developed by Hayes was used for the regulatory role of the job stress scale in the effect of the sustainable leadership scale on the innovation strategies scale. As a result, in this analysis, it was observed that job stress did not have a significant regulatory effect on the relationship between sustainable leadership and innovation strategies.

Keywords: *Sustainable Leadership, Innovation Strategies, Job Stress.*

SÜRDÜRÜLEBİLİR LİDERLİK VE İNOVASYON STRATEJİLERİ İLİŞKİSİNDE İŞ STRESİNİN DÜZENLEYİCİ ROLÜ

Öz

Bu çalışmanın amacı, sürdürülebilir liderlik ve inovasyon stratejileri arasındaki ilişkide iş stresinin düzenleyici rolünü araştırmaktır. Literatürde yapılan çalışmalarda sürdürülebilir liderlik ve inovasyon stratejileri arasındaki ilişkide iş stresinin düzenleyici rolünün ölçüldüğü bir çalışmaya rastlanmamıştır. Bu durum çalışma için bir öncelik ve özgünlük unsuru oluşturması açısından önemlidir.

* Asst. Prof. Dr., İstanbul Esenyurt University, mesutoztirak@esenyurt.edu.tr, <https://orcid.org/0000-0003-4828-7293>

** Asst. Prof. Dr., İstanbul Gelisim University, ayazici@gelisim.edu.tr, <https://orcid.org/0000-0001-6769-2599>

Araştırmanın evrenini Türkiye'de faaliyet gösteren bilgi ve iletişim sektörü çalışanları oluşturmaktadır. Örneklem ise, İstanbul ili Ataşehir bölgesinde bilgi ve iletişim sektöründe çalışan ve kolayda örnekleme yöntemi ile seçilen 402 çalışandır. Araştırmada ölçek puanları hesaplanmış ve puanların normal dağılıma uygunluğunu belirlemek için basıklık ve çarpıklık katsayıları analiz edilmiştir. Puanlar normal dağılım gösterdiği için çalışmada parametrik test teknikleri kullanılmıştır. Demografik özelliklere göre ölçek puanlarındaki farklılıkları analiz etmek için t-testi ve ANOVA testi kullanılmıştır. Ayrıca ölçekler arasındaki ilişki korelasyon katsayısı ile analiz edilirken, sürdürülebilir liderlik ölçeğinin inovasyon stratejileri ölçeği üzerindeki etkisinde iş stresi ölçeğinin düzenleyici rolü için Hayes tarafından geliştirilen Süreç makrosu kullanılmıştır. Sonuç olarak, bu analizde iş stresinin sürdürülebilir liderlik ve inovasyon stratejileri arasındaki ilişkide anlamlı bir düzenleyici etkiye sahip olmadığı görülmüştür.

Anahtar Kelimeler: *Sürdürülebilir Liderlik, İnovasyon Stratejileri, İş Stresi.*

Introduction

Sustainable leadership and innovation strategies play an important role in regulating work stress. Job stress is a common problem that negatively affects employees' performance, motivation, and overall health. Sustainable leadership and innovation strategies can be effective in reducing and managing work stress.

With the Brundtland report published by the World Commission on Environment and Development, the concept of sustainability has started to be accepted globally and has become an important issue worldwide (Elkington, 1998; Ehnert and Harry, 2012; Awasthi et al., 2018; Wang et al., 2014; Xavier et al., 2019). The World Commission on Environment and Development defined sustainability as "meeting today's needs with social consensus, taking into account the needs of the future" and suggested that economic, environmental, and social dimensions should be realized and considered simultaneously for sustainability at the social level (Purvis et al., 2019). The World Commission on Environment and Development emphasizes the importance of meeting current needs while taking into account the needs of future generations. This definition reflects the idea that development should not compromise the ability of future generations to meet their own needs.

In an environment where change is accelerating day by day, it is inevitable that businesses that cannot keep up with innovation will enter the entropy process rapidly. Businesses can collect the cream of the market with new products or reduce production costs by innovating their processes. Moreover, they can communicate more effectively with the target market by developing new marketing methods. Despite all the uncertainty of the results of innovation, businesses have to participate in the innovation process because the consequences of not keeping up with innovation often lead to heavy costs (Clercq et al., 2008). Businesses need to foster a culture of innovation and

develop strategies that allow them to stay agile, adapt to change, and continually explore new opportunities.

Innovation strategies are a new concept that has emerged in relation to the production processes or organizational structure of enterprises (Koyluoglu and Dogan, 2021). Innovation strategies are used to provide high-added value to the management performance of enterprises and to improve their performance. Innovation strategy adds value to firms in the competitive environment by guiding their decisions on how a firm should use its resources to innovate (Akhlagh et al., 2013) and guides firms to do the best with their own resources and their own capabilities. According to another point of view, innovation strategy is a process that reviews the competitive situation in the sector in which the firm is, determines objectives according to this situation, and helps to make the right choices (Deniz, 2011). Innovation strategies encompass a variety of approaches and methodologies that businesses can adopt to foster innovation within their processes, products, and services.

Sustainable innovation involves the development and implementation of new business practices in a way that contributes to sustainability goals (Rennings, 2000). In order to create sustainable forms of innovation, a consensus needs to be reached about the requirements and plans for the future. This means that sustainable leaders are needed to fulfill the purpose of the innovation vision. As part of the process, one way to draw attention to innovation is through the nurturing of these ideas (Bos-Brouwers, 2010). Overall, sustainable innovation requires a holistic and forward-looking approach.

The fact that resources such as time and personal energy are limited in the workplace suggests that workplace stressors should reduce the implementation of innovation. Employees need time and energy to complete their tasks at work (Hobfoll, 1989). However, stress factors deplete these resources. Under resource-constrained conditions, employees are less likely to devote time and energy to behaviors that exceed role requirements. In contrast to this assumption, the cybernetic perspective of workplace stressors offers an alternative perspective (Qian et al., 2018). This view is based on control theory, which argues that actions are guided by values and goals and that the purpose of an activity is to reduce discrepancies between the current goal state and the set goals (Carver and Scheier, 1998). Workplace stressors can be seen as obstacles to achieving work goals. As such, they emphasize a goal-state mismatch that needs to be bridged, indicating the need for change (Diefendorff and Lord, 2003). This view implies that encountering stressors at work can trigger innovative behaviors as a means of proactively coping with stressors by improving aspects of the environment or the self (Long, 1998). This perspective suggests that stressors can trigger a need for change and encourage employees to take proactive steps to address the challenges they face.

1. CONCEPTUAL FRAMEWORK

1.1. Sustainable Leadership

Sustainable leadership refers to a style of leadership that focuses on long-term success and viability while considering the impact on the environment, society, and organizational stakeholders. It involves making decisions and taking actions that prioritize sustainability principles and practices, ensuring the well-being of future generations. (Fullan, 2004). Sustainable leaders not only communicate the importance of sustainability but also create a culture that includes sustainability (Avery, 2005). This approach to leadership recognizes that businesses and organizations operate within a larger ecosystem that includes environmental and social factors. By taking these factors into account, sustainable leaders strive to create a positive impact not only in the present but also for the future.

Sustainable leaders take a long-term perspective and consider the potential consequences of their decisions on future generations. They prioritize sustainable growth, innovation, and adaptability to address evolving challenges and opportunities (Middlebrooks et al., 2009). Sustainable leaders recognize the interconnectedness of various systems, such as economic, social, and environmental systems. They understand that decisions in one area can have ripple effects across others and aim for holistic solutions that balance multiple needs and goals. (Pelinescu and Rădulescu, 2011). Sustainable leadership is a concept that emphasizes the importance of considering not just short-term gains, but also the long-term impact and well-being of people, the environment, and society as a whole.

Sustainable leaders are committed to minimizing negative environmental impacts and promoting sustainable practices. They consider the use of renewable resources, reduce waste and emissions, and encourage energy efficiency (Hollmann, 2012). Sustainable leaders understand the importance of engaging and involving all stakeholders, including employees, customers, investors, suppliers, and local communities. They value collaboration, transparency, and open communication to build trust and foster long-term relationships (Šimanskienė and Župerkienė, 2014). Sustainable leaders embody the values and behaviors they promote. They lead by example, demonstrate integrity, and inspire others to embrace sustainable practices and values (Burns et al., 2015). By adopting sustainable leadership practices, organizations can create a positive impact on the environment, society, and their own long-term success. It involves a shift towards a more holistic and responsible approach that goes beyond short-term profit maximization to consider the broader implications of business decisions.

1.2. Innovation Strategies

Innovation strategies refer to the deliberate plans and approaches that organizations employ to foster and promote innovation within their operations. These strategies are designed to encourage the generation of new ideas, the development of creative solutions, and the implementation of innovative processes, products, or services (Lopez et al., 2009). Successful innovation strategies are tailored to an organization's industry, goals, resources, and culture. They require strong leadership, a clear vision, and a willingness to adapt and evolve as the innovation landscape changes.

As a result of the increase in information exchange between countries, societies have entered a rapid change process. Advanced information sharing and progress in technologies cause changes in the structures of enterprises. Thanks to these innovations, businesses gain an advantage over their competitors and strengthen their position against their competitors by establishing systematic and continuous strategies to protect the advantage they have gained (Atakan, 2017). It highlights how businesses can harness these changes to gain a competitive edge and secure their position in the market through well-defined and ongoing strategies.

Innovation is the development of a new process or product and its introduction to the market. Innovation is the stage after invention (Tschmuck, 2006). Innovation should not be considered only in a technical framework. For this reason, innovation can be expressed as a process of putting new ideas into practice and implementation, not only products and services, but also any event, phenomenon, and situation.

Innovation strategies are the ability to use plans and technology that guide development decisions in enterprises. It is also stated as guiding technological developments in the enterprise and determining strategies in a sustainable competitive environment, desired innovation in resources, and effective use of resources (Özaydın and Çelik, 2020). The first step that successful innovative enterprises take for innovation management is the choice of a strategy for the top managers of the organization. In order to develop an innovation strategy, it is first necessary to determine at which level and in which areas innovation is needed. Successful innovation requires a clear understanding by everyone in an organization, from the top manager to the lowest employee. One of the functions of an innovation strategy is to determine which types of innovation is the preference to continue (Akhlagh et al., 2013). Innovation strategy is a very difficult stage in which the identification of possible areas of innovation that can differentiate the organization and the creation of a road map including action steps for these is a very difficult stage (Cooper and Edgett, 2010). It's important to note that innovation strategies are not one-size-fits-all solutions. Each organization should tailor its approach based on its industry, competitive landscape, resources, and long-term objectives (Akhlagh et al., 2013). It provides a clear understanding of the importance of innovation strategies in guiding an

organization's innovation efforts. The need for strategic planning, collaboration, and adaptation to create a roadmap for successful innovation is essential.

1.3. Job Stress

Today's advanced industrial societies are under a lot of stress in work and social life, unlike the past periods. Job stress is one of the most important problems that organizations have to deal with in order for employees to perform a quality job. Every employee in organizational life, regardless of the level, experiences stress.

Stress is the non-specific reaction of the organism to any kind of change (Selye, 1956). Stress is an individual's experience of feelings of anxiety, sadness, tension, and pressure that have different effects on different people (Ivanvewich and Matteson, 1980). Stress may arise from external causes (sociological, environmental) as well as from the person himself/herself (psychological) (Öztrak, 2023; Sharma et al., 2010). Understanding stress is crucial, as excessive or chronic stress can have detrimental effects on an individual's physical and mental health.

The relationship between personal characteristics and health suggests that job stress leads to job dissatisfaction, depression, physical ailments, and behavioral disorders (Murphy, 1995). Prolonged exposure to job stress can lead to more serious physical and mental health issues, including burnout, depression, and anxiety disorders. It can also negatively affect job satisfaction, work performance, and overall quality of life. Organizations recognize the importance of managing job stress to promote employee well-being, improve productivity, and reduce turnover rates. (Lu, 1999). Various strategies, such as implementing supportive work environments, providing resources for stress management, promoting work-life balance, and fostering open communication, are often employed to mitigate job stress and create healthier workplaces. (Tubre and Judith, 2000). The effects of job stress can extend beyond personal health. It can negatively impact job satisfaction and work performance. Additionally, it can affect an individual's overall quality of life, implying that the effects of job stress can permeate various aspects of one's existence.

2. METHODOLOGY

2.1. Data Sample and Measurements

The purpose of this study is to examine the regulatory role of job stress in the relationship between sustainable leadership and innovation strategies. The population of the study consists of employees working in the information and communication sector operating in Turkey. The sample of the study is 402

employees selected by convenience sampling method in the information and communication sector in the Ataşehir region of Istanbul province.

In the study, the sustainable leadership scale developed by Mc Cann and Holt (2011) and adapted into Turkish by Mısırdalı et al. (2019) was used. The sustainable leadership scale consists of four dimensions and 15 items.

The innovation strategies scale used by Göral (2012) consists of six dimensions and 19 items.

In the study, Demiral et al. (2007) aimed to evaluate the validity and reliability of the Turkish adaptation of the Swedish Workload-Work Control Social Support Questionnaire, the work stress scale consists of four dimensions and 17 items.

All scales used in the study were authorized by the authors.

2.2. Research Hypotheses and Model

In the study, Demiral et al. (2007) aimed to evaluate the validity and reliability of the Turkish adaptation of the Swedish Workload-Work Control Social Support Questionnaire, the work stress scale consists of four dimensions and 17 items.

Sustainable leaders contribute to managing diversity and reducing conflict within the organization. They are also known as individuals who can enable team members to improve themselves (Ferdig, 2007).

Based on the concept of sustainable leadership in the literature, the hypotheses created for this study are given below.

H1: There is a significant relationship between sustainable leadership and innovation strategies.

H2: There is a significant relationship between sustainable leadership and job stress.

H3: Job stress has a regulatory role in the relationship between sustainable leadership and innovation strategies.

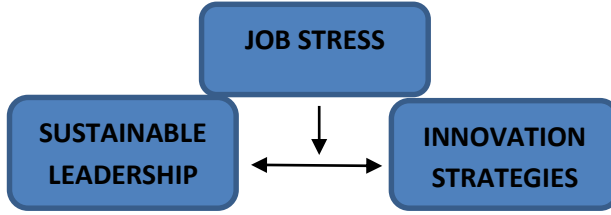
H4: Sustainable leadership differs significantly according to demographic variables.

H5: Innovation strategies differ significantly according to demographic variables.

H6: Job stress shows a significant difference according to demographic variables.

For the purpose of the study, the model is shown in Figure 1 below.

Figure 1. Research Model



3. RESULTS

The data were analysed with SPSS 24.0. In the study, scale scores were calculated and kurtosis and skewness coefficients were analyzed to determine the suitability of the scores for normal distribution. The kurtosis and skewness values obtained from the scales between +3 and -3 are considered sufficient for normal distribution (Groeneveld and Meeden, 1984; Moors, 1986; Hopkins and Weeks, 1990; De Carlo, 1997).

Table 1. Kurtosis and Skewness Values

	n	Skewness	Kurtosis
Ethical-social responsibility dimension	402	-0,520	-0,759
Change dimension	402	-0,342	-0,546
Innovation-profitability dimension	402	-0,060	-1,219
Culture-human resources interest dimension	402	-0,349	-0,863
Sustainable leadership scale	402	-0,288	-0,834
Offensive innovation strategy	402	-0,275	-0,769
Defensive innovation strategy	402	0,034	-1,104
Imitative innovation strategy	402	-0,197	-1,279
Dependent innovation strategy	402	-0,134	0,653
Opportunistic innovation strategy	402	-1,155	0,998
Traditional innovation strategy	402	-0,304	-1,218
Innovation strategies scale	402	0,325	0,439
Workload	402	0,253	-0,041
Skill utilisation	402	0,195	-0,940
Freedom of decision	402	0,024	-0,749
Social support	402	-0,423	-0,349
Job stress scale	402	0,174	-0,778

When the values are analyzed, it is seen that the kurtosis and skewness coefficients of each score are between -3 and +3. According to this result, it

was concluded that the scores were normally distributed. Due to the normal distribution of the scores, parametric test techniques were used in the study. T-test and ANOVA tests were used to analyze the difference in the scale score according to demographic characteristics. While the t-test was used to analyze demographic variables with 2 groups, the ANOVA test was used to analyze variables with k ($k > 2$) groups. In addition to these, the relationship between the sustainable leadership scale, innovation strategies scale, and job stress scale was analyzed with the Pearson correlation coefficient, while the Process macro developed by Hayes was used for the moderating role of the job stress scale in the effect of the sustainable leadership scale on the innovation strategies scale. As a result of the analysis made with Model 1, moderation was examined. PROCESS macro Model 1 allows researchers to examine the relationship between the independent variable (X) and the dependent variable (Y) and to understand how this relationship changes with a regulator variable (M). Model 1 is particularly used for interaction or regulator analysis, also called regulation analysis (Hayes, 2013). In Model 1, the interaction of variables X and M ($X \times M$) is calculated and the effect of this interaction on variable Y is analyzed. The interaction term shows how the effect of the independent variable on the dependent variable changes depending on the values of the regulator variable. If the interaction term is significant, this indicates that the regulator variable regulator the effect of the independent variable on the dependent variable.

4. FINDINGS

Table 2. Distribution of Demographic Characteristics

		n	%
Gender	Female	227	56,5
	Male	175	43,5
Age	48 and under	327	81,3
	48 and above	75	18,7
Marital status	Single	136	33,8
	Married	266	66,2
Educational status	Undergraduate	60	14,9
	Postgraduate	342	85,1
Length of work	0-3 years	101	25,1
	4-10 years	101	25,1
	11-20 years	150	37,3
	21 +	50	12,4

Table 3. Descriptive Statistics of Scale Scores

	n	Min	Max	\bar{x}	Std. deviation
Ethical-social responsibility dimension	402	2	5	3,64	1,04
Change dimension	402	2	5	3,76	0,87
Innovation-profitability dimension	402	2	5	3,45	0,99
Culture-human resources interest dimension	402	1	5	3,43	1,10
Sustainable leadership scale	402	2	5	3,54	0,97
Offensive innovation strategy	402	1	5	3,62	0,92
Defensive innovation strategy	402	1	5	3,27	0,78
Imitative innovation strategy	402	1	5	3,10	1,05
Dependent innovation strategy	402	1	5	3,78	0,58
Opportunistic innovation strategy	402	1	5	3,81	1,05
Traditional innovation strategy	402	1	5	3,02	1,30
Innovation strategies scale	402	1	5	3,42	0,51
Workload	402	1	5	3,65	0,66
Skill utilisation	402	2	5	3,52	0,78
Freedom of decision	402	1	5	3,24	1,11
Social support	402	1	5	3,30	1,09
Job stress scale	402	2	5	3,44	0,78

Table 4. Investigation of Sustainable Leadership, Innovation Strategies, and Job Stress Scale Scores in Terms of Gender

Gender	n	\bar{x}	Std. deviation	t	p	
Ethical-social responsibility dimension	Female	227	3,76	1,13	2,813	0,005*
	Male	175	3,48	0,89		
Change dimension	Female	227	3,73	0,98	-0,954	0,341
	Male	175	3,81	0,69		
Innovation-profitability dimension	Female	227	3,60	1,10	3,725	0,000*
	Male	175	3,25	0,79		
Culture-human resources interest dimension	Female	227	3,44	1,27	0,063	0,950
	Male	175	3,43	0,83		
Sustainable leadership scale	Female	227	3,60	1,12	1,477	0,140
	Male	175	3,47	0,73		
Offensive innovation strategy	Female	227	3,77	0,86	3,637	0,000*
	Male	175	3,43	0,97		
Defensive innovation strategy	Female	227	3,05	0,74	-7,119	0,000*

	Male	175	3,57	0,72		
	Female	227	2,96	1,01		
Imitative innovation strategy	Male	175	3,29	1,08	-3,066	0,002*
	Female	227	3,72	0,52		
Dependent innovation strategy	Male	175	3,86	0,64	-2,446	0,015*
	Female	227	3,88	1,19		
Opportunistic innovation strategy	Male	175	3,71	0,83	1,627	0,105
	Female	227	3,32	1,33		
Traditional innovation strategy	Male	175	2,62	1,15	5,564	0,000*
	Female	227	3,43	0,42		
Innovation strategies scale	Male	175	3,40	0,60	0,588	0,557
	Female	227	3,48	0,45		
Workload	Male	175	3,86	0,81	-5,479	0,000*
	Female	227	3,38	0,83		
Skill utilisation	Male	175	3,71	0,66	-4,502	0,000*
	Female	227	2,88	1,08		
Freedom of decision	Male	175	3,71	0,96	-8,195	0,000*
	Female	227	3,07	1,25		
Social support	Male	175	3,60	0,75	-5,217	0,000*
	Female	227	3,23	0,79		
Job stress scale	Male	175	3,71	0,69	-6,380	0,000*

Table 4 presents the mean values (\bar{x}), standard deviation (SD) values, and t-test results of the participants' perceptions of the ethical-social responsibility dimension, change dimension, innovation-profitability dimension, culture-human resources interest dimension, sustainable leadership scale, offensive innovation strategy, defensive innovation strategy, imitative innovation strategy, dependent innovation strategy, opportunistic innovation strategy, traditional innovation strategy, innovation strategies scale, workload, skill utilisation, freedom of decision, social support, work stress scale.

There are significant differences between gender groups in terms of perceptions of the ethical-social responsibility dimension, innovation-profitability dimension, offensive innovation strategy, defensive innovation strategy, imitative innovation strategy, dependent innovation strategy, traditional innovation strategy, workload, skill utilisation, freedom of decision, social support and work stress scale ($p > 0.05$).

Ethics-social responsibility dimension, innovation-profitability dimension, offensive innovation strategy, and traditional innovation strategy

and innovation strategies scale mean score of female participants' perceptions is higher than male participants.

The mean score of defensive innovation strategy, imitative innovation strategy, dependent innovation strategy, workload, skill utilisation, freedom of decision, social support, and work stress scale is higher for male participants than female participants.

The observed differences in perceptions of innovation strategies and related dimensions between male and female participants can be attributed to a combination of social, psychological, and cultural factors. It is important to emphasize that these explanations are speculative and that the observed gender differences may result from complex and multifaceted interactions between individual, cultural, and societal factors. To more accurately understand the reasons behind these differences, it will be necessary to conduct empirical research involving a wide range of participants, taking into account their backgrounds and experiences.

Table 5. Investigation of Sustainable Leadership, Innovation Strategies, and Job Stress Scale Scores in Terms of Age

	Age	n	\bar{x}	Std. deviation	t	p																																																																																																
Ethical-social responsibility dimension	48 and above	327	3,73	1,00	3,651	0,000*																																																																																																
	48 and under	75	3,22	1,11			Change dimension	48 and above	327	3,89	0,82	5,990	0,000*	48 and under	75	3,22	0,88	Innovation-profitability dimension	48 and above	327	3,55	1,00	5,020	0,000*	48 and under	75	3,00	0,82	Culture-human resources interest dimension	48 and above	327	3,61	0,99	6,166	0,000*	48 and under	75	2,67	1,23	Sustainable leadership scale	48 and above	327	3,67	0,92	5,833	0,000*	48 and under	75	2,98	1,00	Offensive innovation strategy	48 and above	327	3,61	0,99	-0,716	0,475	48 and under	75	3,67	0,52	Defensive innovation strategy	48 and above	327	3,30	0,81	1,563	0,120	48 and under	75	3,17	0,63	Imitative innovation strategy	48 and above	327	3,23	1,11	8,599	0,000*	48 and under	75	2,56	0,42	Dependent innovation strategy	48 and above	327	3,69	0,60	-11,170	0,000*	48 and under	75	4,17	0,24	Opportunistic innovation strategy	48 and above	327	3,66	1,09	-10,118	0,000*	48 and under
Change dimension	48 and above	327	3,89	0,82	5,990	0,000*																																																																																																
	48 and under	75	3,22	0,88			Innovation-profitability dimension	48 and above	327	3,55	1,00	5,020	0,000*	48 and under	75	3,00	0,82	Culture-human resources interest dimension	48 and above	327	3,61	0,99	6,166	0,000*	48 and under	75	2,67	1,23	Sustainable leadership scale	48 and above	327	3,67	0,92	5,833	0,000*	48 and under	75	2,98	1,00	Offensive innovation strategy	48 and above	327	3,61	0,99	-0,716	0,475	48 and under	75	3,67	0,52	Defensive innovation strategy	48 and above	327	3,30	0,81	1,563	0,120	48 and under	75	3,17	0,63	Imitative innovation strategy	48 and above	327	3,23	1,11	8,599	0,000*	48 and under	75	2,56	0,42	Dependent innovation strategy	48 and above	327	3,69	0,60	-11,170	0,000*	48 and under	75	4,17	0,24	Opportunistic innovation strategy	48 and above	327	3,66	1,09	-10,118	0,000*	48 and under	75	4,44	0,42								
Innovation-profitability dimension	48 and above	327	3,55	1,00	5,020	0,000*																																																																																																
	48 and under	75	3,00	0,82			Culture-human resources interest dimension	48 and above	327	3,61	0,99	6,166	0,000*	48 and under	75	2,67	1,23	Sustainable leadership scale	48 and above	327	3,67	0,92	5,833	0,000*	48 and under	75	2,98	1,00	Offensive innovation strategy	48 and above	327	3,61	0,99	-0,716	0,475	48 and under	75	3,67	0,52	Defensive innovation strategy	48 and above	327	3,30	0,81	1,563	0,120	48 and under	75	3,17	0,63	Imitative innovation strategy	48 and above	327	3,23	1,11	8,599	0,000*	48 and under	75	2,56	0,42	Dependent innovation strategy	48 and above	327	3,69	0,60	-11,170	0,000*	48 and under	75	4,17	0,24	Opportunistic innovation strategy	48 and above	327	3,66	1,09	-10,118	0,000*	48 and under	75	4,44	0,42																			
Culture-human resources interest dimension	48 and above	327	3,61	0,99	6,166	0,000*																																																																																																
	48 and under	75	2,67	1,23			Sustainable leadership scale	48 and above	327	3,67	0,92	5,833	0,000*	48 and under	75	2,98	1,00	Offensive innovation strategy	48 and above	327	3,61	0,99	-0,716	0,475	48 and under	75	3,67	0,52	Defensive innovation strategy	48 and above	327	3,30	0,81	1,563	0,120	48 and under	75	3,17	0,63	Imitative innovation strategy	48 and above	327	3,23	1,11	8,599	0,000*	48 and under	75	2,56	0,42	Dependent innovation strategy	48 and above	327	3,69	0,60	-11,170	0,000*	48 and under	75	4,17	0,24	Opportunistic innovation strategy	48 and above	327	3,66	1,09	-10,118	0,000*	48 and under	75	4,44	0,42																														
Sustainable leadership scale	48 and above	327	3,67	0,92	5,833	0,000*																																																																																																
	48 and under	75	2,98	1,00			Offensive innovation strategy	48 and above	327	3,61	0,99	-0,716	0,475	48 and under	75	3,67	0,52	Defensive innovation strategy	48 and above	327	3,30	0,81	1,563	0,120	48 and under	75	3,17	0,63	Imitative innovation strategy	48 and above	327	3,23	1,11	8,599	0,000*	48 and under	75	2,56	0,42	Dependent innovation strategy	48 and above	327	3,69	0,60	-11,170	0,000*	48 and under	75	4,17	0,24	Opportunistic innovation strategy	48 and above	327	3,66	1,09	-10,118	0,000*	48 and under	75	4,44	0,42																																									
Offensive innovation strategy	48 and above	327	3,61	0,99	-0,716	0,475																																																																																																
	48 and under	75	3,67	0,52			Defensive innovation strategy	48 and above	327	3,30	0,81	1,563	0,120	48 and under	75	3,17	0,63	Imitative innovation strategy	48 and above	327	3,23	1,11	8,599	0,000*	48 and under	75	2,56	0,42	Dependent innovation strategy	48 and above	327	3,69	0,60	-11,170	0,000*	48 and under	75	4,17	0,24	Opportunistic innovation strategy	48 and above	327	3,66	1,09	-10,118	0,000*	48 and under	75	4,44	0,42																																																				
Defensive innovation strategy	48 and above	327	3,30	0,81	1,563	0,120																																																																																																
	48 and under	75	3,17	0,63			Imitative innovation strategy	48 and above	327	3,23	1,11	8,599	0,000*	48 and under	75	2,56	0,42	Dependent innovation strategy	48 and above	327	3,69	0,60	-11,170	0,000*	48 and under	75	4,17	0,24	Opportunistic innovation strategy	48 and above	327	3,66	1,09	-10,118	0,000*	48 and under	75	4,44	0,42																																																															
Imitative innovation strategy	48 and above	327	3,23	1,11	8,599	0,000*																																																																																																
	48 and under	75	2,56	0,42			Dependent innovation strategy	48 and above	327	3,69	0,60	-11,170	0,000*	48 and under	75	4,17	0,24	Opportunistic innovation strategy	48 and above	327	3,66	1,09	-10,118	0,000*	48 and under	75	4,44	0,42																																																																										
Dependent innovation strategy	48 and above	327	3,69	0,60	-11,170	0,000*																																																																																																
	48 and under	75	4,17	0,24			Opportunistic innovation strategy	48 and above	327	3,66	1,09	-10,118	0,000*	48 and under	75	4,44	0,42																																																																																					
Opportunistic innovation strategy	48 and above	327	3,66	1,09	-10,118	0,000*																																																																																																
	48 and under	75	4,44	0,42																																																																																																		

Traditional innovation strategy	48 and above	327	2,97	1,36	-1,890	0,061
	48 and under	75	3,22	0,96		
Innovation strategies scale	48 and above	327	3,40	0,55	-2,387	0,018
	48 and under	75	3,49	0,20		
Workload	48 and above	327	3,79	0,62	14,781	0,000*
	48 and under	75	3,00	0,36		
Skill utilisation	48 and above	327	3,65	0,76	7,796	0,000*
	48 and under	75	3,00	0,62		
Freedom of decision	48 and above	327	3,37	1,18	9,971	0,000*
	48 and under	75	2,67	0,24		
Social support	48 and above	327	3,60	0,91	13,953	0,000*
	48 and under	75	2,00	0,82		
Job stress scale	48 and above	327	3,63	0,73	21,626	0,000*
	48 and under	75	2,58	0,23		

Since the number of employees under the age of 48 and over the age of 48 is predominant in the organization we selected as the sample, the study was conducted on these employees.

Table 5 presents the mean values (\bar{x}), standard deviation (SD) values, and t-test results of the participants' perceptions of the ethics-social responsibility dimension, change dimension, innovation-profitability dimension, culture-human resources interest dimension, sustainable leadership scale, offensive innovation strategy, defensive innovation strategy, imitative innovation strategy, dependent innovation strategy, opportunistic innovation strategy, traditional innovation strategy, innovation strategies scale, workload, skill utilisation, freedom of decision, social support, work stress scale.

According to the results of the analyses, ethical-social responsibility dimension, change dimension, innovation-profitability dimension, culture-human resources interest dimension, sustainable leadership scale, imitative innovation strategy, workload, skill utilisation, freedom of decision, social support, job stress scale scores differ according to age ($p < 0.05$).

According to the mean scores, the scores of those under the age of 48 on the ethics-social responsibility dimension, change dimension, innovation-profitability dimension, culture-human resources interest dimension, sustainable leadership scale, imitative innovation strategy, workload, skill utilisation, freedom of decision, social support, work stress scale are higher than those aged 48 and above.

According to the results of the analysis, opportunistic innovation strategy and traditional innovation strategy scores differ according to age ($p < 0.05$). According to the mean scores, while the opportunistic innovation

strategy and traditional innovation strategy score of those aged 48 and over is the highest, it is higher than those under the age of 48.

Individuals aged 48 and older may have more experience in the field or industry, which may lead to a better understanding of the nuances of innovation strategies. Their accumulated knowledge and wisdom may make them more likely to appreciate the value of both opportunistic and traditional innovation. Younger individuals may be more open to risk and experimentation, while older individuals may have a more cautious approach. Individuals over 48 may be more pragmatic and focused on practical, achievable outcomes. They may see the value in combining both opportunistic and traditional innovation approaches to cover a wider range of products. Industry and market conditions can play a role. If the industry is mature and stable, traditional innovation may be more favored.

Table 6. Investigation of Sustainable Leadership, Innovation Strategies, and Job Stress Scale Scores in Terms of Marital Status

Marital status	n	\bar{x}	Std. deviation	t	p	
Ethical-social responsibility dimension	Single	136	3,52	0,97	-1,541	0,124
	Married	266	3,69	1,07		
Change dimension	Single	136	3,62	0,75	-2,598	0,010*
	Married	266	3,84	0,91		
Innovation-profitability dimension	Single	136	3,31	0,94	-2,054	0,041*
	Married	266	3,52	1,01		
Culture-human resources interest dimension	Single	136	3,33	1,10	-1,359	0,175
	Married	266	3,49	1,10		
Sustainable leadership scale	Single	136	3,42	0,90	-1,842	0,066
	Married	266	3,61	1,00		
Offensive innovation strategy	Single	136	3,54	0,88	-1,199	0,231
	Married	266	3,66	0,94		
Defensive innovation strategy	Single	136	3,24	0,77	-0,729	0,466
	Married	266	3,30	0,78		
Imitative innovation strategy	Single	136	3,41	0,88	4,606	0,000*
	Married	266	2,94	1,10		
Dependent innovation strategy	Single	136	3,86	0,57	2,159	0,031*
	Married	266	3,73	0,58		
Opportunistic innovation strategy	Single	136	3,89	0,89	1,185	0,237
	Married	266	3,77	1,12		
Traditional innovation strategy	Single	136	3,50	0,99	6,084	0,000*

	Married	266	2,77	1,37		
	Single	136	3,54	0,59		
Innovation strategies scale	Married	266	3,35	0,45	3,497	0,001*
	Single	136	3,64	0,54		
Workload	Married	266	3,65	0,72	-0,094	0,925
	Single	136	3,50	0,64		
Skill utilisation	Married	266	3,54	0,84	-0,534	0,594
	Single	136	3,09	0,97		
Freedom of decision	Married	266	3,32	1,17	-2,075	0,039*
	Single	136	3,15	1,20		
Social support	Married	266	3,37	1,02	-1,936	0,054
	Single	136	3,35	0,65		
Job stress scale	Married	266	3,48	0,84	-1,620	0,106

Table 6 presents the mean values (\bar{x}), standard deviation (SD) values, and t-test results of the participants' perceptions of the ethics-social responsibility dimension, change dimension, innovation-profitability dimension, culture-human resources interest dimension, sustainable leadership scale, offensive innovation strategy, defensive innovation strategy, imitative innovation strategy, dependent innovation strategy, opportunistic innovation strategy, traditional innovation strategy, innovation strategies scale, workload, skill utilisation, freedom of decision, social support, work stress scale according to marital status.

According to the results of the analyses, the change dimension, innovation-profitability dimension, and freedom of decision score differ according to marital status ($p < 0.05$). According to the mean scores, while the change dimension, innovation-profitability dimension, and freedom of decision score of the married ones are the highest, it is higher than the single ones.

According to the results of the analyses, the scores of imitative innovation strategy, dependent innovation strategy, traditional innovation strategy, and innovation strategies scale differ according to marital status ($p < 0,05$). According to the mean scores, the imitative innovation strategy, dependent innovation strategy, traditional innovation strategy, and innovation strategies scale score of the single ones is higher than the married ones.

Married individuals may have a greater sense of responsibility due to family obligations that may influence their approach to innovation and decision-making. This may lead them to be more cautious or focus on profitable innovations. On the other hand, single individuals may be more willing to take risks and explore different innovation strategies. Married

individuals may have an established support system in their families, which may give them the confidence to pursue more innovative and profitable ideas.

Table 7. Investigation of Sustainable Leadership, Innovation Strategies, and Job Stress Scale Scores in Terms of Educational Status

Educational status		n	\bar{x}	Std. deviation	t	p
Ethical-social responsibility dimension	Undergraduate	60	3,63	1,06	-0,021	0,983
	Postgraduate	342	3,64	1,04		
Change dimension	Undergraduate	60	3,77	0,87	0,021	0,983
	Postgraduate	342	3,76	0,87		
Innovation-profitability dimension	Undergraduate	60	3,48	0,99	0,261	0,795
	Postgraduate	342	3,44	0,99		
Culture-human resources interest dimension	Undergraduate	60	3,44	1,10	0,058	0,954
	Postgraduate	342	3,43	1,10		
Sustainable leadership scale	Undergraduate	60	3,55	0,97	0,092	0,927
	Postgraduate	342	3,54	0,97		
Offensive innovation strategy	Undergraduate	60	3,68	0,88	0,506	0,613
	Postgraduate	342	3,61	0,93		
Defensive innovation strategy	Undergraduate	60	3,28	0,75	0,001	0,999
	Postgraduate	342	3,27	0,78		
Imitative innovation strategy	Undergraduate	60	3,16	1,05	0,420	0,674
	Postgraduate	342	3,09	1,05		
Dependent innovation strategy	Undergraduate	60	3,81	0,60	0,450	0,653
	Postgraduate	342	3,77	0,57		
Opportunistic innovation strategy	Undergraduate	60	3,89	0,90	0,701	0,484
	Postgraduate	342	3,79	1,07		
Traditional innovation strategy	Undergraduate	60	2,93	1,24	-0,531	0,595
	Postgraduate	342	3,03	1,31		
Innovation strategies scale	Undergraduate	60	3,44	0,48	0,399	0,690
	Postgraduate	342	3,41	0,51		
Workload	Undergraduate	60	3,66	0,69	0,163	0,871
	Postgraduate	342	3,64	0,66		
Skill utilisation	Undergraduate	60	3,58	0,77	0,584	0,559
	Postgraduate	342	3,52	0,78		
Freedom of decision	Undergraduate	60	3,28	1,08	0,246	0,806
	Postgraduate	342	3,24	1,11		
Social support	Undergraduate	60	3,32	1,11	0,130	0,896

	Postgraduate	342	3,30	1,09		
	Undergraduate	60	3,46	0,78		
Job stress scale	Postgraduate	342	3,43	0,78	0,292	0,771

Table 7 presents the mean values (\bar{x}), standard deviation (SD) values, and t-test results of the participants' perceptions of the ethics-social responsibility dimension, change dimension, innovation-profitability dimension, culture-human resources interest dimension, sustainable leadership scale, offensive innovation strategy, defensive innovation strategy, imitative innovation strategy, dependent innovation strategy, opportunistic innovation strategy, traditional innovation strategy, innovation strategies scale, workload, skill utilisation, freedom of decision, social support, work stress scale.

According to the results of the analyses, it is seen that there is no significant difference between the level of education in terms of ethics-social responsibility dimension, change dimension, innovation-profitability dimension, culture-human resources interest dimension, and sustainable leadership scale ($p > 0.05$). It is seen that there is no significant difference between the level of education in terms of offensive innovation strategy, defensive innovation strategy, imitative innovation strategy, dependent innovation strategy, opportunistic innovation strategy, traditional innovation strategy, and innovation strategies scale ($p > 0,05$). There is no significant difference between the level of education in terms of perceptions of workload, skill utilization, freedom of decision, social support, and work stress scale ($p > 0,05$).

Experience in the labor force can significantly shape an individual's perception of the work environment. People with more experience may perceive certain factors differently due to their familiarity with the work and its challenges. The culture of the organization plays an important role in shaping employees' perceptions. A company that values employee input and provides strong social support can lead to more favorable perceptions of these factors, regardless of education level. People have unique personalities, motivations, and preferences that can influence how they perceive their work environment. These differences may overshadow the effects of education level. Perceptions of work-related factors may also be influenced by cultural and regional norms. What is considered stressful or supportive in one culture may differ in another.

Table 8. Investigation of Sustainable Leadership, Innovation Strategies, and Job Stress Scale Scores in Terms of Length

	Length	n	\bar{x}	Std. deviation	ANOVA	
					F	p
Ethical-social responsibility dimension	0-3 years	101	4,31	0,49	30,584	0,000*
	4-10 years	101	3,48	1,13		
	11-20 years	150	3,56	0,94		
	21 +	50	2,83	1,18		
Change dimension	0-3 years	101	4,16	0,56	39,829	0,000*
	4-10 years	101	4,15	0,64		
	11-20 years	150	3,50	0,86		
	21 +	50	3,00	1,01		
Innovation-profitability dimension	0-3 years	101	4,11	0,73	25,850	0,000*
	4-10 years	101	3,36	1,20		
	11-20 years	150	3,21	0,74		
	21 +	50	3,00	1,01		
Culture-human resources interest dimension	0-3 years	101	4,09	0,65	25,500	0,000*
	4-10 years	101	3,49	1,09		
	11-20 years	150	3,20	0,95		
	21 +	50	2,70	1,52		
Sustainable leadership scale	0-3 years	101	4,15	0,59	28,724	0,000*
	4-10 years	101	3,58	0,99		
	11-20 years	150	3,33	0,84		
	21 +	50	2,87	1,21		
Offensive innovation strategy	0-3 years	101	4,00	1,02	27,234	0,000*
	4-10 years	101	3,04	1,00		
	11-20 years	150	3,83	0,70		
	21 +	50	3,38	0,38		
Defensive innovation strategy	0-3 years	101	2,50	0,40	86,895	0,000*
	4-10 years	101	3,85	0,31		
	11-20 years	150	3,33	0,85		
	21 +	50	3,50	0,51		
Imitative innovation strategy	0-3 years	101	2,69	1,20	27,379	0,000*
	4-10 years	101	3,56	1,17		
	11-20 years	150	3,33	0,75		
	21 +	50	2,33	0,34		
Dependent innovation strategy	0-3 years	101	3,39	0,44	54,526	0,000*
	4-10 years	101	4,22	0,54		

	11-20 years	150	3,67	0,55		
	21 +	50	4,00	0,00		
	0-3 years	101	3,67	1,58		
Opportunistic innovation strategy	4-10 years	101	3,39	0,72	15,431	0,000*
	11-20 years	150	3,94	0,73		
	21 +	50	4,50	0,51		
	0-3 years	101	2,67	1,73		
Traditional innovation strategy	4-10 years	101	3,39	0,86	5,778	0,001*
	11-20 years	150	2,94	1,18		
	21 +	50	3,17	1,18		
	0-3 years	101	3,15	0,24		
Innovation strategies scale	4-10 years	101	3,53	0,56	13,628	0,000*
	11-20 years	150	3,51	0,60		
	21 +	50	3,45	0,24		
	0-3 years	101	3,42	0,40		
Workload	4-10 years	101	3,78	0,46	80,126	0,000*
	11-20 years	150	4,00	0,69		
	21 +	50	2,75	0,00		
	0-3 years	101	3,18	0,55		
Skill utilisation	4-10 years	101	4,04	0,74	70,474	0,000*
	11-20 years	150	3,71	0,67		
	21 +	50	2,63	0,38		
	0-3 years	101	2,37	0,82		
Freedom of decision	4-10 years	101	3,98	0,96	74,843	0,000*
	11-20 years	150	3,58	1,02		
	21 +	50	2,50	0,00		
	0-3 years	101	3,16	0,99		
Social support	4-10 years	101	3,74	0,84	17,082	0,000*
	11-20 years	150	3,36	1,27		
	21 +	50	2,50	0,51		
	0-3 years	101	3,13	0,60		
Job stress scale	4-10 years	101	3,86	0,56	51,790	0,000*
	11-20 years	150	3,64	0,84		
	21 +	50	2,59	0,28		

Table 8 presents the mean values (\bar{x}), standard deviation (SD) values, and ANOVA test results of the participants' perceptions of the ethical-social

responsibility dimension, change dimension, innovation-profitability dimension, interest in culture-human resources interest dimension, sustainable leadership scale, offensive innovation strategy, defensive innovation strategy, imitative innovation strategy, dependent innovation strategy, opportunistic innovation strategy, traditional innovation strategy, innovation strategies scale, workload, skill utilisation, freedom of decision, social support, job stress scale according to the duration of employment in the organization.

According to the results of the analyses, the ethics-social responsibility dimension, change dimension, innovation-profitability dimension, culture-interest in human resources dimension, sustainable leadership scale, and offensive innovation strategy score differ according to working time in the organization ($p < 0.05$). According to the mean scores, those whose working time in the organization is between 0-3 years have the lowest score in the ethical-social responsibility dimension, change dimension, innovation-profitability dimension, culture-interest in human resources dimension, sustainable leadership scale, and offensive innovation strategy in the other group. According to the results of the analysis, defensive innovation strategy, imitative innovation strategy, dependent innovation strategy, traditional innovation strategy, innovation strategies scale, skill use, freedom of decision, social support and job stress scale scores differ according to the working time in the institution ($p < 0.05$). According to their average scores, those whose working time in the institution is between 4-10 years have the highest scores on the defensive innovation strategy, imitative innovation strategy, dependent innovation strategy, traditional innovation strategy, innovation strategies scale, skill use, freedom of decision, social support and work stress scale, while the scores of those in the other group are the lowest. According to the results of the analysis, the opportunistic innovation strategy and workload score differ according to the working time in the institution ($p < 0.05$). According to their average scores, those with 11-20 years of employment in the institution have the highest opportunistic innovation strategy and workload score, while those in the other group have the lowest score.

Employees with shorter working hours may be trying to adapt to the culture, practices, and expectations of the organization. Employees with more experience may have developed more skills and autonomy in their roles, which may lead to higher scores on dimensions related to innovation strategies, skill utilization, and freedom of decision. Employees with longer service may have leadership roles or positions with higher responsibilities, potentially affecting the dimensions related to leadership, ethics, and workload. The organization itself may have changed over time which affects how different employees perceive and respond to the various dimensions. This may explain the differences in culture, strategy, and workload scores. Employee turnover may influence these results. If employees with fewer years of service are more likely to leave the organization, this may affect the overall scores on certain dimensions.

Table 9. Investigation of the Relationship between Sustainable Leadership, Innovation Strategies and Job Stress Scale Scores

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Ethical-social responsibility dimension	r	1															
	p																
Change dimension	r	,877**	1														
	p	,000															
Innovation profitability dimension	r	,892**	,775**	1													
	p	,000	,000														
Culture human resources Interest dimension	r	,903**	,847**	,946**	1												
	p	,000	,000	,000													
Sustainable leadership scale	r	,956**	,899**	,961**	,982**	1											
	p	,000	,000	,000	,000												
Offensive innovation strategy	r	,659**	,432**	,728**	,611**	,649**	1										
	p	,000	,000	,000	,000	,000											
Defensive innovation strategy	r	-,318**	-,220**	-,159**	-,097	-,188**	-,023	1									
	p	,000	,000	,001	,052	,000	,645										
Imitative innovation strategy	r	-,097	-,187**	,015	,037	-,036	-,051	,473**	1								
	p	,052	,000	,760	,461	,470	,306	,000									
Dependent	r	-,358**	-,225**	-,370**	-,347**	-,349**	-,278**	,448**	,565**	1							

The Moderator Role of Job Stress in the Relationship Between Sustainable Leadership and Innovation Strategies

innovation strategy	r																				
	p	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00
Opportunistic innovation strategy	r	,217**	,125*	,441**	,284**	,296**	,731**	,326**	-,118*	-,101*	1										
	p	,00	,012	,000	,000	,000	,000	,000	,018	,042											
Traditional innovation strategy	r	-,269**	-,350**	-,324**	-,236**	-,298**	-,424**	,309**	,401**	,398**	-,337**	1									
	p	,000	,000	,000	,000	,000	,000	,000	,000	,000	,000										
Innovation strategies scale	r	,037	-,095	,201**	,170**	,110*	,392**	,753**	,652**	,471**	,524**	,411**	1								
	p	,462	,058	,000	,001	,027	,000	,000	,000	,000	,000	,000									
Workload	r	,248**	,278**	,201**	,201**	,234**	,403**	,265**	,316**	,063	,216**	-,369**	,272**	1							
	p	,000	,000	,000	,000	,000	,000	,000	,000	,207	,000	,000	,000								
Skill utilization	r	,549**	,638**	,576**	,551**	,598**	,484**	,245**	,318**	,101*	,355**	-,341**	,358**	,745**	1						
	p	,000	,000	,000	,000	,000	,000	,000	,000	,043	,000	,000	,000	,000							
Freedom of decision	r	,397**	,512**	,336**	,407**	,422**	,304**	,507**	,031	-,080	,359**	-,194**	,319**	,543**	,724**	1					
	p	,000	,000	,000	,000	,000	,000	,000	,536	,109	,000	,000	,000	,000	,000						
Social support	r	,447**	,501**	,590**	,624**	,583**	,346**	,366**	,156**	-,374**	,320**	-,306**	,237**	,493**	,622**	,720**	1				
	p	,000	,000	,000	,000	,000	,000	,000	,002	,000	,000	,000	,000	,000	,000	,000					
Job stress scale	r	,494**	,570**	,554**	,579**	,578**	,441**	,398**	,233**	-,171**	,365**	-,358**	,327**	,751**	,861**	,849**	,910**	1			
	p	,000	,000	,000	,000	,000	,000	,000	,000	,001	,000	,000	,000	,000	,000	,000	,000				

In the correlation analysis, various degrees of relationships were found between almost all variables and their sub-dimensions.

There is a very strong positive relationship between the ethics-social responsibility dimension and change dimension, innovation-profitability dimension, culture-human resources interest dimension, and sustainable leadership scale. There is a moderately strong negative relationship between the ethical-social responsibility dimension and the defensive innovation strategy and dependent innovation strategy. There is a weak positive relationship between the ethical-social responsibility dimension and the opportunistic innovation strategy and workload. There is a weak negative relationship between the ethical-social responsibility dimension and the traditional innovation strategy. There is a positive, moderately strong relationship between the ethical-social responsibility dimension and the skill utilisation, freedom of decision, social support, and job stress scale. There is a very strong positive relationship between the dimension of change and the dimension of interest in culture-human resources interest and the scale of sustainable leadership. There is a strong positive relationship between the change dimension and the innovation-profitability dimension and skill utilisation.

There is a positive, moderately strong relationship between the change dimension and offensive innovation strategy, freedom of decision, social support, and job stress scale. There is a weak negative relationship between change dimension and defensive innovation strategy, imitative innovation strategy, and dependent innovation strategy. There is a weak positive relationship between change size and workload. There is a very strong positive relationship between the innovation-profitability dimension, the culture-human resources interest dimension, and the sustainable leadership scale. There is a strong positive relationship between the innovation-profitability dimension and the offensive innovation strategy. There is a weak negative relationship between the innovation-profitability dimension and the defensive innovation strategy. There is a moderately strong negative relationship between the innovation-profitability dimension and the dependent innovation strategy and the traditional innovation strategy. There is a moderately strong positive relationship between the innovation-profitability dimension and the opportunistic innovation strategy, skill utilisation, freedom of decision, social support, and job stress scale. There is a very strong positive relationship between the dimension of culture-human resources interest and the scale of sustainable leadership.

There is a strong positive relationship between culture-human resources interest and offensive innovation strategy and social support. There is a moderately strong negative relationship between culture-human resources interest and dependent innovation strategy. There is a weak positive relationship between the culture-human resources interest dimension and opportunistic innovation strategy, the scale of innovation strategies, and workload. There is a weak negative relationship between culture-human resources interest and traditional innovation strategy. There is a positive,

moderately strong relationship between the dimension of culture-human resources interest and skill utilisation, freedom of decision, and job stress scale. There is a strong positive relationship between the sustainable leadership scale and the offensive innovation strategy. There is a weak negative relationship between sustainable leadership scale and defensive innovation strategy and traditional innovation strategy. There is a positive, moderately strong relationship between the sustainable leadership scale and the dependent innovation strategy. There is a weak positive relationship between sustainable leadership scale and opportunistic innovation strategy, innovation strategies scale, and workload. There is a positive, moderately strong relationship between the sustainable leadership scale and skill utilisation, freedom of decision, social support, and job stress scale.

Table 10. Examining the Regulatory Role of Job Stress in the Effect of Sustainable Leadership on Innovation Strategies

Variable	Coefficient	Standard error	t	p	%95 CI Lower	%95 CI Upper
Constant	2,985	0,423	7,053	0	2,153	3,818
Job stres	0,185	0,133	1,389	0,166	-0,077	0,446
Sustainable leadership	-0,127	0,117	-1,085	0,279	-0,356	0,103
Interaction	0,019	0,034	0,571	0,568	-0,048	0,086

First of all, according to the results of the analysis, the R square value of the model was found to be 0.1 and the p-value to be 0.0. This indicates that the model provides a 10% variance in explaining innovation strategies, including the term sustainable leadership, job stress, and interaction ($F(3, 398) = 17.6, p < 0.001$).

The moderator effect of job stress on the relationship between sustainable leadership and innovation strategies was evaluated with the analysis for the interaction term. The interaction term is statistically insignificant ($b = 0.019, t = 0.571, p = 0.568$), indicating that job stress does not have a significant moderator effect on the relationship between sustainable leadership and innovation strategies.

In addition, the conditional effects of the relationship between sustainable leadership and innovation strategies according to different values of job stress were also examined. Conditional effects, which were examined at three different values, the mean value of the job stress scale and one standard deviation below and above the mean, were not found to be statistically significant in all three cases.

Conclusion

In this study, the regulatory role of job stress in the relationship between sustainable leadership and innovation strategies was examined. When the results were evaluated in general, it was seen that job stress did not have a significant regulator effect on the relationship between sustainable leadership and innovation strategies. These findings suggest that job stress does not significantly change the effect of sustainable leadership practices on innovative strategies.

Productivity is important today, as the importance of innovating is increasingly recognized. In this highly competitive environment, businesses are trying to maintain their sustainability and gain market share. For this reason, business leaders have to develop different strategies to sustain growth and move their businesses forward. In light of this pressure, employees are under stress for the survival of businesses and to produce innovation. An appropriate leadership style is essential that will guide employees under this pressure and help them progress toward their goals. Sustainable leaders create a milestone both in reducing this pressure on employees and in realizing the sustainable development of technology-producing companies by linking the innovation strategy. As a result, we can say that a sustainable leadership style in businesses where innovation strategies are adopted and stress is high will benefit not only subordinates but also managers at all levels of the organization.

This study was conducted on employees operating in the information and communication sector. Technology producing companies can adopt sustainable leadership as a management strategy to implement innovation strategies. However, organisations should create a mutual exchange of information and a productive environment among employees in order to cope with stressful environments. In an environment of information exchange, sustainable leaders are in a better position to receive feedback and suggestions from employees. This helps leaders to make effective decisions. Therefore, sustainable leaders should focus on networking and the exchange of information among employees. In addition to all these, sustainable leaders need to be in effective communication for employees and create an environment where they can coach and brainstorm. This environment they create can help employees to successfully promote innovative projects.

The limitations of this study are as follows. The data collection process in our study was limited to the information and communication sector in developing countries such as Turkey. In terms of the general applicability of the findings, data collection in other sectors may be considered and this may provide different results in the future. Also, different stress factors can be analysed in future studies.

Hakem Değerlendirmesi: Dış Bağımsız

Yazar Katkısı: Mesut Öztürk: %50, Ayşe Meriç Yazıcı: %50.

Destek ve Teşekkür Beyanı: Çalışma için destek alınmamıştır.

Etik Onay: Bu çalışma etik onay gerektiren herhangi bir insan veya hayvan araştırması içermemektedir. / Bu çalışmanın gerçekleştirilmesi amacıyla, İstanbul Esenyurt Üniversitesi Etik Kurulu'ndan izin alınmıştır (25.05.2023 / 2023/05-25) alınmıştır.

Çıkar Çatışması Beyanı: Çalışma ile ilgili herhangi bir kurum veya kişi ile çıkar çatışması bulunmamaktadır.

Peer Review: Independent double-blind

Author Contributions: Mesut Öztürk: 50%, Ayşe Meriç Yazıcı: 50%.

Funding and Acknowledgement: No support was received for the study.

Ethics Approval: This study does not contain any human or animal research that requires ethical approval. / Ethics committee approval (25.05.2023 / 2023/05-25) was obtained from İstanbul Esenyurt University Ethics Committee for the purpose of carrying out this study approval.

Conflict of Interest: There is no conflict of interest with any institution or person related to the study.

References

- Akhlagh, E.M. Moradi, M. Mehdizade, M. & Ahmadi, N.D. (2013). Innovation strategies, performance diversity and development: An empirical analysis in İnan construction and housing industry. *Iranian Journal of Management Studies*, 6(2), 31-60.
- Atakan, S.C. (2017). Yenilik stratejileri ile yenilik performansı arasındaki ilişki. *İstanbul Ticaret Üniversitesi Girişimcilik Dergisi*, 1(2), 29-42.
- Awasthi, A. Govindan, K. & Gold, S. (2018). Multi-tier sustainable global supplier selection using a fuzzy AHP-VIKOR based approach. *International Journal of Production Economics*, 195, 106-117. <https://doi.org/10.1016/j.ijpe.2017.10.013>
- Avery, G. (2005). *Leadership for sustainable futures: Achieving success in a competitive world*. Edward Elgar Publishing.
- Bos-Brouwers, H. (2010). Corporate sustainability and innovation in SMEs: evidence of themes and activities in practice. *Business Strategy and the Environment*, 19, 417-435.
- Burns, H. Diamond-Vaught, H. & Bauman, C. (2015). Leadership for sustainability: Theoretical foundations and pedagogical practices that foster change. *International Journal of Leadership Studies*, 9(1), 86-100.
- Carver, C.S. & Scheier, M.F. (1998). *On the self-regulation of behavior*. New York: Cambridge University Press.

- Clercq, D. Menguc, B. & Auh, S. (2008). Unpacking there lationship between an innovation strategy and firm performance: The role of task conflict and politicalactivity. *Journal of Business Research*, 62, 1046-1053.
- Cooper, R.G. & Edgett, S.J. (2010). Developing a product innovation and technology strategy for your business. *Research Technology Management*, 53, 33-40.
- De Carlo, L.T. (1997). On the meaning and use of kurtosis. *Psychological Methods*, 2, 292-307. <http://dx.doi.org/10.1037/1082-989X.2.3.292>
- Demiral, Y. Ünal, B. Kılıç, B. Sosyal, A. Bilgin, A. C. Uçku, R. & Theorell, T. (2007). İş stresi ölçeğinin İzmir Konak Belediyesi'nde çalışan erkek işçilerde geçerlik ve güvenilirliğinin incelenmesi. *Toplum Hekimliği Bülteni*, 26(1).
- Deniz, M. (2011). Kobi'ler de yenilik, yenilik stratejileri ve bir uygulama. *Sosyal ve Ekonomik Araştırmalar Dergisi*, 11(22), 141-176.
- Diefendorff, J.M. & Lord, R.G. (2003). The volitional and strategic effects of planning on task performance and goal commitment. *Human Performance*, 16(4), 365-387. https://doi.org/10.1207/S1532704HUP1604_3
- Ehnert, I. & Harry, W. (2012). Recent developments and future prospects on sustainable human resource management. *Management Revue*, 23(3), 221-238. <https://doi.org/10.2307/4183719>
- Elkington, J. (1998). Partnerships from cannibals with forks: The triple bottom line of 21st-century business. *Environ. Qual. Manag.*, 8, 37-51.
- Ferdig, M.A. (2007). Sustainability leadership: Co-creating a sustainable future. *Journal of Change Management*, 7(1), 25-35.
- Fullan, M. (2004). *Leadership and sustainability: System thinkers in action*, San Francisco: Jossey-Bass.
- Groeneveld, R.A. & Meeden, G. (1984). Measuring skewness and kurtosis. *The Statistician*, 33, 391-399. <https://doi.org/10.2307/2987742>
- Göral, M. (2012). *Liderlik tarzlarının yenilik stratejilerine etkisinin otel işletmeleri açısından değerlendirilmesi* [master thesis]. Düzce University.
- Hayes, A.F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford Press.
- Hobfoll, S.E. (1988). *The Ecology of Stress*. Washington: Hemisphere.
- Hopkins, K.D. & Weeks, D.L. (1990). Tests for normality and measures of skewness and kurtosis: Their place in research reporting. *Educational and Psychological Measurement*, 50(4), 717-729. <https://doi.org/10.1177/0013164490504001>

- Hollmann, S. (2012). *Sustainable leadership: Modellentwicklung, empirische Überprüfung und Gestaltungshinweise*. Deutschland: Springer.
- Ivancevich, J.M. & Matteson, M.T. (1980). Optimizing human resources: A case for preventive health and stress management. *Organizational Dynamics*, 9, 5-25. [https://doi.org/10.1016/0090-2616\(80\)90037-6](https://doi.org/10.1016/0090-2616(80)90037-6)
- Koyluoglu, S. & Dogan. M. (2021). The impact of innovation strategies on business performance: Practices in high technology companies in Turkey. *Marketing and Management of Innovations*, 4, 168-183. <http://doi.org/10.21272/mmi.2021.4-13>
- Long, B.C. (1998). Coping with workplace stress: A multiple-group comparison of female managers and clerical workers. *Journal of Counseling Psychology*, 45(1), 65-78. <https://doi.org/10.1037/0022-0167.45.1.65>
- Lopez, M. Perez, M. & Rodriguez, L. (2009). Corporate social responsibility and innovation in European companies. An empirical research. *Corporate Ownership and Control*, 7(1), 274-284.
- Lu, L. (1999). Work motivation, job stress and employee's well-being. *Journal of Applied Management Studies*, 8(1), 61-73.
- Mısırdalı Yangil, F. & Dil Şahin, M. (2019), Sürdürülebilir liderlik ölçeği: geçerlik ve güvenilirlik analizi. *Business & Management Studies: An International Journal*, 7(5), 2124-2147. <http://dx.doi.org/10.15295/bmij.v7i5.1276>
- Middlebrooks, A. Miltenberger, L. Tweedy, J. Newman, G. & Follman, J. (2009). Developing a sustainability ethic in leaders. *Journal of Leadership Studies*, 3(2), 31-43.
- Moors, J.J.A. (1986). The meaning of kurtosis: Darlington reexamined. *The American Statistician*, 40, 283-284.
- Murphy, L.R. (1995). Managing job stress: An employees assistance/human resource management partnership. *Personel Review*, 24(1), 41-50.
- Özaydın, G. & Çelik, Y. (2020). Liderlik tarzları ve görev performansının tarım işletmelerinde yenilik stratejileri üzerine etkisi (Çumra ilçesi örneği). *KSÜ Tarım ve Doğa Dergisi*, 23(1), 181-193. DOI:10.18016/ksutarimdog.vi.540374
- Öztrak, M. (2023). A study on the impact of artificial intelligence anxiety on the innovation-oriented behaviours of employees. *Optimum Ekonomi ve Yönetim Bilimleri Dergisi*, 10(2), 267-286. <https://doi.org/10.17541/optimum.1255576>
- Pelinescu, E. & Rădulescu, M. (2011). New times, new economy... A new born leader: The eco-leader. *Hyperion International Journal of Econophysics & New Economy*, 4(1), 81-94.

- Purvis, B. Mao, Y. & Robinson, D. (2019). Three pillars of sustainability: in search of conceptual origins. *Sustainability Science*, 14, 681-695. <https://doi.org/10.1007/s11625-018-0627-5>
- Rennings, K. (2000). Redefining innovation- eco-innovation research and the contribution from ecological economics. *Ecol Econ.*, 32(2), 319-332.
- Selye, H. (1956). *The stress of life*. New York: McGraw-Hill.
- Šimanskienė, L. & Župerkienė, E. (2014). Sustainable leadership: The new challenge for organizations. *Forum Scientiae Oeconomia*, 2(1), 81-93.
- Sharma, A. Verma, S. Verma, C. & Malhotra, D. (2010). Stress and burnout as predictors of job satisfaction amongst lawyers. *European Journal of Social Sciences*, 14(3), 348-359.
- Tschmuck, P. (2006). *Creativity and innovation in the music industry*. Springer.
- Tubre, T.C. & Judith, M.C. (2000). A meta-analysis of the relationships between role ambiguity, role conflict and performance. *Journal of Management*, 26(1), 155-169.
- Wang, X. Van Wart, M. & Lebrede, N. (2014). Sustainability leadership in a local government context. *Public Performance & Management Review*, 37(3), 339-364.
- Xavier, L.Y. Jacobi, P.R. & Turra, A. (2019). Local agenda 21: Planning for the future, changing today. *Environmental Science & Policy*, 101, 7-15.